

# (12) UK Patent Application (19) GB (11) 2 249 416 A (13)

(43) Date of A publication 06.05.1992

(21) Application No 9122857.7

(22) Date of filing 28.10.1991

(30) Priority data

(31) 904728

(32) 31.12.1990

(33) IE

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(51) INT CL<sup>5</sup>

G06F 15/24

(52) UK CL (Edition K)

G4A AUX

(56) Documents cited

WO 90/11572 A1

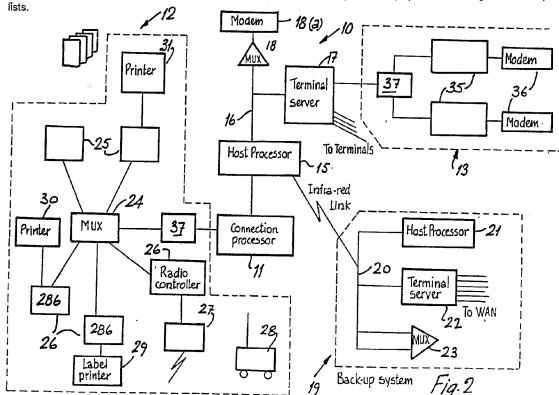
(58) Field of search

UK CL (Edition K) G4A AUX

INT CL<sup>5</sup> G06F 15/24

## (54) Stock control system

(57) A stock and price control computer system includes a host computer system (1) for communication with a distribution computer system (10) which, in turn, includes various sub-systems including a warehouse sub-system (12) and remote communications sub-system (13). Price and stock data is transmitted from the host computer system (1) to a host processor (15) of the distribution computer system. The host processor also receives data relating to the warehouse sub-system (12). The remote communications sub-system (13) includes polling computers (35) for polling computer systems in retail stores and downloading of price and stock data and also for uploading of order data. The order data is transmitted to a warehouse sub-system microcomputer (25) via the host processor (15) for automatic generation of picking lists.



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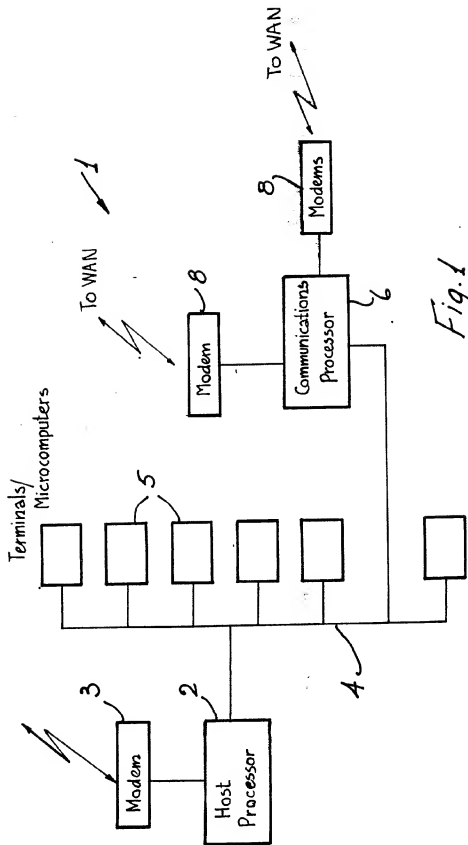


Fig. 1

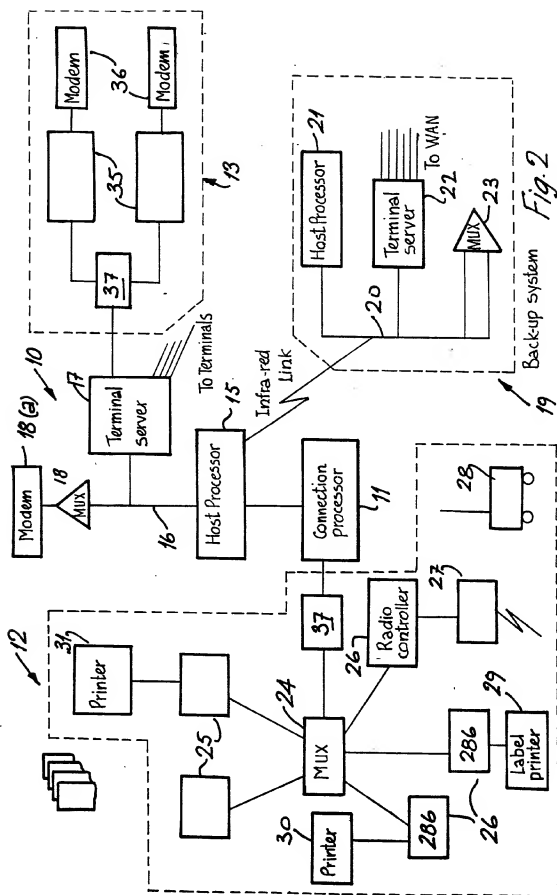


Fig. 2

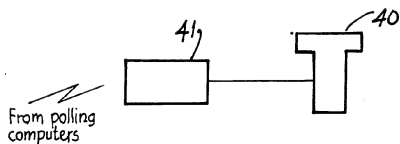


Fig. 3(a)

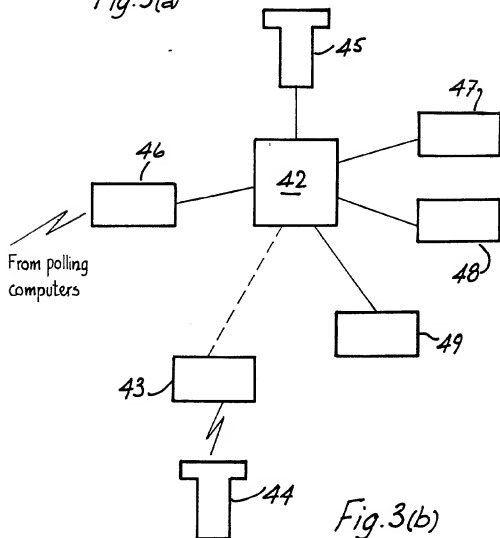


Fig. 3(b)

- 1 -

"A Computer System for Stock Control

The present invention relates to a computer system for stock and price control in a situation where there are a large number of retail stores receiving goods from distribution centres.

5 In general, in such a situation there is usually a central computer which carries out required processing operations including sales order, purchase order, stock control, price control functions and various other processing functions. Documents are printed and are forwarded to the retail stores  
10 to provide information regarding prices and stock availability.

A disadvantage of such a system is that there is generally relatively little communication between distribution centres, head offices, sub-offices and the retail stores. A further  
15 problem is that the information is not received in a timely manner. For example, information for ordering goods from a distribution centre may be received too late and so delays are caused. A further problem is that monitoring of prices and stock levels at retail stores is a time-consuming exercise and  
20 accordingly mistakes often occur.

It is an object of the invention to provide a computer system which in an efficient and timely manner gathers and processes all relevant information for delivery to retail stores and distribution centres.

- 5 According to the invention there is provided a stock and price control computer system comprising:-

10 a host computer system comprising a host processor connected in a local area network of terminals and microcomputers, the host processor having a multi-processing operating system and being connected to a communications means in the local area network, the communications means being for monitoring data files of the host processor for changes during a time period and generating an up-date file of the monitored changes;

15

20 a distribution computer system comprising accounting, purchasing, sales order processing, remote communications and warehouse sub-systems, the warehouse sub-system having terminals and microcomputers interconnected at a multiplexing station and connected to label and order-printing printers, the remote communications sub-system comprising a polling computer connected to a modem for polling of remote retail computer systems for

updating of prices and other data and reception of  
order data, wherein the polling computer comprises  
means for automatically generating a polling signal  
at preset time intervals to establish a  
5 communication link and comprising means for  
automatically receiving uploaded order data from the  
retail computer system, merging uploaded order data  
and automatically transmitting the merged order data  
to a microcomputer in the warehouse sub-system for  
10 automatic generation of warehouse picking lists.

In one embodiment of the invention the retail computer system  
comprises means for receiving master price lists data from the  
polling computer, means for receiving actual price data of the  
retail store, and means for comparing the master and actual  
15 prices to generate a price variation audit report.

Preferably the retail computer system is for connection with  
a bar-code scanner for uploading to the computer of actual  
price lists. Typically the bar-code scanner is incorporated  
in a hand-held terminal.

20 In a particularly preferred embodiment of the invention the  
retail computer is portable, and a serial port of a modem of  
the retail store computer system includes a battery charging  
pin for automatic battery charging of the portable computer  
when connected to the modem for remote communication.

In one embodiment of the invention the host computer comprises means for merging additional order data with the received order data before re-transmission to the warehouse sub-system microcomputer.

5 The invention will be more clearly understood from the following description of some preferred embodiments thereof, given by way of example only with reference to the accompanying drawings in which:-

Fig. 1 is a representation of a host computer system of  
10 the invention;

Fig. 2 is a representation of a distribution computer system; and

Figs. 3(a) and 3(b) are representations of retailer computer systems.

15 Referring to Fig. 1, there is illustrated a host computer system of the invention indicated generally by the reference numeral 1. The system 1 comprises a host processor 2 connected by a modem 3 to a development computer, not shown. The host processor 2 is connected in a local area network 4 in  
20 which are connected microcomputers and terminals 5. The local area network 4 also includes a communications processor 6.



The host processor 2 is a UNIX-based microcomputer with a 200 Mbyte disk and a 4 Mbyte memory. The host processor 2 has a single system console connected locally and many user workstations. The host processor 2 stores general data regarding  
5 stock and product details, price details and other data relating to group purchasing or sales.

The communications processor 6 is a 286-based microcomputer with a 40 Mbyte hard disk and 1.44 Mbyte floppy disk drive. The communications processor 2 comprises monitoring circuits  
10 which monitor file updates of the host processor 2 and captures them at regular intervals. The monitoring circuits include means for transmitting the file updates on a wide area network via modems 8.

Referring now to Fig. 2, there is illustrated a distribution  
15 computer system 10 which is linked with the host computer system 1. The distribution system 10 comprises a central connection processor 11 which interconnects several sub-systems including a warehouse sub-system 12. A remote communications sub-system 13. The connection processor 11 is  
20 connected to a host processor 15 which carries out functions common to all sub-systems. The other sub-systems include accounting, purchasing and sales order processing sub-systems.

The host processor 15 is a UNIX-based RISC processor with a 1500 Mbyte fixed disk and a 32 Mbyte memory. The host processor 15 is connected in a local area network 16 which includes many terminals and microcomputers connected via a  
5 terminal server 17. A multiplexing station 18 connects the host processor 15 and the local area network 16 generally to a wide area network via modems 18(a).

The host processor 15 is also connected to a nearby (within two kilometres) back-up distribution system computer system 19  
10 which has a local area network 20 with a UNIX-based host computer 21, a terminal server 22 for connection with many terminals and microcomputers, and a multiplexing station 23 for connection in the wide area network. The communication link between the distribution host processor 15 and the back-  
15 up distribution system 19 is a high-speed line-of-sight infra-red data link. A cable is also used for back-up purposes.

In more detail, the warehouse sub-system 12 comprises an RS232 multiplexer 24 connected to two 386 microcomputers 25 and to several 286 terminals 26, only two of which are shown. The  
20 multiplexer 24 is also connected to an 8086-XT radio link controller 26 connected to a radio transmitter 27. The radio transmitter 27 is for transmission of control signals to fork-lift vehicles 28 having radio receiving equipment. The warehouse sub-system 12 also includes a label printer 29 and  
25 a printer 30 connected to terminals 26 for printing of labels

and check-in sheets respectively. A printer 31 is connected to a microcomputer 25 for printing of picking lists for the warehouse.

The remote communication sub-system 13 comprises a pair of  
5 polling computers 35 connected to modems 36 for communication with retail stores. The polling computers 35 are connected to the host processor 15 via the terminal server 17 and an operating system conversion circuit 37. A similar conversion circuit 37 is connected between the multiplexer 24 of the  
10 warehouse sub-system 12 and the connection processor 11. In this case, conversion is between the DOS and UNIX operating systems.

Referring now to Figs. 3(a) and 3(b), two retail computer systems are illustrated. In Fig. 3(a), the computer system  
15 comprises a hand-held terminal 40 for direct connection with a modem 41. In Fig. 3(b), the retail computer system comprises a microcomputer 42 which may be connected to a radio transmitter 43 for radio communication with a hand-held terminal 44. There is also provided a socket for connection  
20 directly with a hand-held terminal 45 and a modem 46 is used for communication with the polling computers 35. The microcomputer 42 is also connected to scanning tills 47, scales 48 and a label printer 49.

In operation, the connection processor 11 of the distribution computer system 10 acts as a connected terminal to the warehouse sub-system 12 for transmission of purchase orders copied from the host processor 15 and also for reception of stock delivery data from the warehouse sub-system 12, which data is re-transmitted to the host processor 15. The connection processor 11 is also used for various other functions which involve communication between the various sub-systems. Some of the sub-systems reside only in the host processor 15, for example, accounting and sales order sub-systems.

The remote communications sub-system 13 is for remote communication with the retail stores. The speed of transmission is 1200 baud. Each polling computer 35 has a database, each record of which relates to a particular retail store. The record generally includes a telephone number, preset times within a week for communication with a retail store and various other data. Each polling computer 35 includes a real time clock which is monitored so that between the hours of 1 a.m. and 6 a.m. the polling computers 35 transmit polling signals via the modems 36 to selected retail stores. The retail store addresses are retrieved from a list which is generated during each polling period. When a retail store is polled, the time of polling is recorded and if a connection is not made a further attempt is made twenty minutes later. The modems 41 and 46 at the retail stores are

programmed so that if a call other than from the polling computers 35 is received during a polling period, the call is not answered for up to ten minutes. This ensures that the telephone line (there is generally only one) is also available  
5 for normal operation.

When a connection is made by a polling computer 35, data is downloaded to the retail store computer system. This data has been retrieved from the host processor 15, which in turn receives much of the information from the host computer system  
10 1 via the wide area network. The data which is downloaded includes maximum and minimum suggested retail selling prices for goods, wholesale prices, details of new goods, price changes, out of stock items, stocks due to increase or decrease in price, and promotion information. This data is  
15 received by the respective modem 41 or 46 and is stored in either the hand-held terminal 40 or the microcomputer 42 which is connected to the modem during the polling period. In turn, after the data has been downloaded from the polling computers 35, the hand-held terminal 40 or the microcomputer 42 of the  
20 retail store computer system uploads data relating to orders for goods from the distribution centre. When the polling computers 35 receive the order data, it is temporarily stored on disk until all of the retail store computer systems have been polled for the polling period. Then, all of the order  
25 data is merged to create an order data file, which file is transmitted via the conversion circuit 37, the terminal server

17, the host processor 15, the connection processor 11, the conversion circuit 37 and the multiplexer 24 to the warehouse microcomputer 25. The warehouse microcomputer 25 includes control circuits which direct generation of picking lists for the following day based on the orders received and the picking lists are printed at the line printer 31. All of these functions are carried out automatically without any human intervention and thus, picking lists are automatically generated with a minimum time delay and during periods when communication lines are not busy and are least expensive. Order data stored in the host processor 15 before the polling period may be merged with that received from the polling computers 35 before re-transmission to the warehouse subsystem.

15 The data which is downloaded to the retail store computer systems is used in different ways. For verification of actual prices being charged in a retail store, a retailer uses either a hand-held terminal 45 or 44, both of which incorporate a bar-code scanner to scan prices of goods on shelves. This data is subsequently downloaded to the microcomputer 42 which carries out comparison operations between the actual prices and master prices received from the polling computers 35. The microcomputer 42 then generates a price report which shows variations which require correction. It will be appreciated that this allows a price audit to be carried out relatively quickly and efficiently at a retail store. Further, the

microcomputer 42 monitors data generated in the scanning tills  
47 and at regular intervals compiles the sales data to  
generate a management or sales report.

The modem 41 of the retail store computer system shown in Fig.  
5 3(a) includes a pin of its RS232 port which is connected to a  
power supply so that when the hand-held terminal 40 is  
connected to the modem 41 the batteries are charged. It will  
thus be appreciated that batteries of the hand-held terminal  
are automatically charged provided the connection to the modem  
10 is made during the set polling period.

It will thus be appreciated that the invention provides for  
timely and efficient communication of information for  
retrieval of goods from distribution centres and also to  
assist in control of retail stores. Because the host  
15 processors of the host computer system 1, the distribution  
computer system 10 and the back-up computer system 19 are all  
connected to a wide area network, it is envisaged that any of  
these systems may act as a host system in which group  
purchasing and sales data is recorded and distributed.

20 The invention is not limited to the embodiments hereinbefore  
described but may be varied in construction and detail.

CLAIMS

1. A stock and price control computer system comprising:-

5 a host computer system comprising a host processor  
connected in a local area network of terminals and  
microcomputers, the host processor having a multi-  
processing operating system and being connected to  
a communications means in the local area network,  
the communications means being for monitoring data  
files of the host processor for changes during a  
10 time period and generating an up-date file of the  
monitored changes;

15 a distribution computer system comprising  
accounting, purchasing, sales order processing,  
remote communications and warehouse sub-systems, the  
warehouse sub-system having terminals and  
microcomputers interconnected at a multiplexing  
station and connected to label and order-printing  
printers, the remote communications sub-system  
comprising a polling computer connected to a modem  
20 for polling of remote retail computer systems for  
updating of prices and other data and reception of  
order data, wherein the polling computer comprises  
means for automatically generating a polling signal  
at preset time intervals to establish a



communication link and comprising means for automatically receiving uploaded order data from the retail computer system, merging uploaded order data and automatically transmitting the merged order data to a microcomputer in the warehouse sub-system for automatic generation of warehouse picking lists.

2. A system as claimed in claim 1, wherein the retail computer system comprises means for receiving master price lists data from the polling computer, means for receiving actual price data of the retail store, and means for comparing the master and actual prices to generate a price variation audit report.
3. A system as claimed in claims 1 or 2, wherein the retail computer system is for connection with a bar-code scanner for uploading to the computer of actual price lists.
4. A system as claimed in claim 3, wherein the bar-code scanner is incorporated in a hand-held terminal.
5. A system as claimed in any preceding claim, wherein the retail computer is portable, and a serial port of a modem of the retail store computer system includes a battery charging pin for automatic battery charging of the portable computer when connected to the modem for remote communication.

6. A system as claimed in any preceding claim, wherein the host computer comprises means for merging additional order data with the received order data before re-transmission to the warehouse sub-system microcomputer.
- 5 7. A system substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

**Patents Act 1977**  
**Examiner's report to the Comptroller under**  
**Section 17 (The Search Report)**

Application number

9122857.7

**Relevant Technical fields**

(i) UK Cl (Edition K ) G4A (AUXF)

(ii) Int Cl (Edition 5 ) G06F 15/24

**Databases (see over)**

(i) UK Patent Office

(ii)

Search Examiner

S J PROBERT

Date of Search

23 JANUARY 1992

Documents considered relevant following a search in respect of claims

1-7

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
A	WO 90/11572 A1 "EPSTEIN"	1

Category	Identity of document and relevant passages	Relevant to claim(s)

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